

## ASSIGNMENT 3

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Textbook assignment: "Computer Components and Circuits," chapter 4, pages, 4-1 through 4-23.

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- 3-1. A computer has a total of how many states in its binary system?
1. One only
  2. Two only
  3. Three only
  4. Four
- 3-2. The digital functions and operations of a computer are based upon what mathematical concept?
1. Calculus
  2. Trigonometry
  3. Logic algebra
  4. Plane geometry
- 3-3. You have been assigned to maintain a set of computers. What must you understand about the computers to successfully accomplish your assignment?
1. What comprises the computer's components
  2. How the components make up the computer's fictional areas
  3. How to determine if a particular component is malfunctioning
  4. All of the above
- 3-4. On input data, a computer performs which of the following types of general functions?
1. Calculus only
  2. Geometric only
  3. Trigonometric and geometric only
  4. Arithmetic and logical
- 3-5. What basis is used to determine the logic circuits to be used in a particular computer?
1. The computer's requirements
  2. The skills of the operator
  3. The computer's location
  4. The software to be used
- 3-6. Which of the following publications lists standard microcircuits?
1. NEETS, Module 7
  2. NEETS, Module 14
  3. ANSI/IEEE 91-1984
  4. MIL-STD-1562
- 3-7. Which of the following publications discusses Boolean algebra?
1. NEETS, Module 9
  2. NEETS, Module 13
  3. NEETS, Module 19
  4. MIL-M-38510
- 3-8. To study wave-generation, you should refer to which of the following publications?
1. NEETS, Module 9
  2. NEETS, Module 19
  3. ANSI/IEEE 91-1984
  4. ANSI/IEEE 991-198
- 3-9. Standard graphic symbols for logic functions are found in which of the following publications?
1. NEETS, Module 7
  2. NEETS, Module 14
  3. ANSI/IEEE 91-1984
  4. MIL-M-38510
- 3-10. The octal and hexadecimal number systems are the most popular derivatives used today by digital computers. From what number system are they derived?
1. Roman
  2. Arabic
  3. Decimal
  4. Binary

IN ANSWERING QUESTIONS 3-11 AND 3-12,  
REFER TO FIGURE 4-1 ON PAGE 4-3 IN THE  
TRAMAN.

3-11. The octal number 14 is what in (a) decimal, (b) binary, and (c) hexadecimal?

1. (a) 12 (b) 01110 (c) 14
2. (a) 12 (b) 01100 (c) C
3. (a) 14 (b) 01100 (c) 14
4. (a) 14 (b) 01110 (c) E

3-12. The decimal number 16 is what in (a) binary, (b) octal, and (c) hexadecimal?

1. (a) 1000 (b) 18 (c) F
2. (a) 1000 (b) 20 (c) 10
3. (a) 10000 (b) 16 (c) 16
4. (a) 10000 (b) 20 (c) 10

3-13. In Boolean algebra, what are the two logic levels?

1. 1 and 0
2. 1 and 2
3. 2 and 0
4. 2 and 3

3-14. Which of the following combinations represents the three basic logic gates used in building the combinational and sequential digital circuits?

1. OR, BUT, ALSO
2. AND, OR, NOT
3. NOT, NEITHER, NOR
4. AND, BUT, OR

3-15. Modern computers rely on what type of circuits?

1. Balanced
2. Monophase
3. Integrated
4. Multipoint

3-16. Integrated circuits provide what three major advantages?

1. High reliability, low cost, and accessibility
2. Low cost, small size, and high reliability
3. Portability, accessibility, and reliability
4. Small size, low cost, and portability

3-17. For which of the following reasons are integrated circuits packaged in various sizes?

1. Number of leads
2. Color coding
3. Size of chip
4. Key coding

3-18. What scale of integration has 10 to 100 gates?

1. Small scale
2. Medium scale
3. Large scale
4. Very large scale

3-19. What factor determines the integration size of an integrated circuit package?

1. The number of chips
2. The types of leads
3. The number of gates
4. The types of keying

3-20. Integrated circuits that combine the technology of bipolar and metal-oxide semiconductors are referred to as what type of circuit?

1. Unipolar
2. Bipolar
3. BIMOS
4. MOS

3-21. Most of a computer's integrated circuits are digital.

1. True
2. False

3-22. To process and store information in a computer's memory, what category of circuit is used?

1. MOS only
2. Bipolar only
3. Digital
4. Linear

3-23. Bipolar integrated circuits include all of the following components except which one?

1. ECL
2. ALS
3. TTL
4. TTLC

3-24. Which of the following components is NOT a part of a MOS integrated circuit?

1. DTL
2. TTLC
3. CMOS
4. HCMOS

3-25. In the determination of whether a computer's logic level is negative or positive, what is the relationship of the two voltages?

1. They are relative to each other
2. They are independent of each other
3. They intermesh with each other
4. One is dominant; the other subordinate

IN ANSWERING QUESTIONS 3-26 THROUGH 3-28, SELECT FROM THE FOLLOWING LIST THE TERM DESCRIBED IN EACH QUESTION.

1. Pulse width
2. Pulse-repetition time
3. Pulse-duration modulation
4. Pulse-repetition frequency

3-26. The time period from a repeating waveshape's starting point until the next starting point.

3-27. The time interval between specified reference points on the leading and trailing edges of a waveform.

3-28. The number of times per second that a signal's complete cycle occurs.

GIVEN: A DIGITAL WAVESHAPE HAS A PRT OF 25  $\mu$ sec AND A NEGATIVE PW OF 15  $\mu$ sec.

IN ANSWERING QUESTIONS 3-29 AND 3-30, REFER TO FIGURE 3A.

3-29. What is the value of the positive PW?

1. 6  $\mu$ sec
2. 8  $\mu$ sec
3. 10  $\mu$ sec
4. 12  $\mu$ sec

3-30. What is the value of the PRF?

1. 37 kHz
2. 40 kHz
3. 43.5 kHz
4. 47.5 kHz

3-31. What is the basic building block for combinational digital circuits?

1. Diode
2. Capacitor
3. Flip-flop
4. Logic gate

3-32. What is the basic building block for sequential circuits?

1. Resistor
2. Conductor
3. Flip-flop
4. Logic gate

3-33. Logic gates perform decision-making functions throughout the computer.

1. True
2. False

3-34. Which of the following is another term for flip-flops?

1. Unistable multivibrators only
2. Bistable multivibrators only
3. Tristable multivibrators only
4. Multivibrators

Figure 3A.—Example statement.

3-35. What are the four types of flip-flops?

1. J-K, set, open, closed
2. Toggle, data, reset-set, J-K
3. Reset-set, data, continuous, open
4. Open, continuous, closed, toggle

3-36. Decision-making functions are composed primarily of which of the following components?

1. Combinational gates
2. Bistable multivibrators
3. Sequential digital circuits
4. Independent linear circuits

IN ANSWERING QUESTIONS 3-37 THROUGH 3-44, SELECT FROM FIGURE 3-B THE DATA ROUTING CIRCUIT DESCRIBED IN THE QUESTION,

- A. Adder and subtracter circuits
  - B. Command signal circuits
  - C. Comparator circuits
  - D. Demultiplexer circuits
  - E. Selector circuits
  - F. Translator circuits

**Figure 3B.—Data routing circuits.**

3-37. Which circuits provide the enable to route data between circuits?

1. A
2. B
3. E
4. F

3-38. Which circuits are used with shift registers and holding registers to perform hyperbolic and trigonometric functions?

1. A
2. B
3. C
4. D

3-39. Which circuits can change machine octal codes into function codes?

1. C
2. D
3. E
4. F

3-40. Which circuits expand the number of input data paths to a register?

1. A
2. C
3. E
4. F

3-41. Which circuits are capable of performing square root when used with shift and holding registers?

1. A
2. C
3. D
4. F

3-42. Which circuits can select an address?

1. B
2. D
3. E
4. F

3-43. Which circuits can be used to compare incoming binary numbers after mathematical operations have been performed?

1. B
2. C
3. D
4. F

3-44. Which circuits route data from one input to any one of several outputs?

1. A
2. D
3. E
4. F

- 3-45. Memory-type functions are accomplished by what type of circuit?
1. Linear
  2. Bipolar
  3. Sequential
  4. Combinational
- 3-46. Counters can only be used in parallel operations.
1. True
  2. False
- 3-47. Counters are used for which of the following functions?
1. For counting operations and quantities only
  2. For counting periods of time only
  3. For addressing information in storage only
  4. For counting operations, quantities, and periods of time; and for addressing information in storage
- 3-48. What items constitute a register?
1. Numbers of circuits
  2. Groups of flip-flops
  3. Numbers of logic gates
  4. All of the above
- 3-49. The length of a register is determined by what factor?
1. The function it performs
  2. The type of logic the computer uses
  3. The number of bits (flip-flops) grouped together
  4. The number system the computer uses: octal or hexadecimal
- 3-50. There are two types of registers most commonly used in computers. Which of the following terms refer to these registers?
1. Memory and backup
  2. Storage and shift
  3. Backup and memory
  4. Storage and backup
- 3-51. What type of storage register, if any, does NOT alter the contents?
1. General
  2. Specialized
  3. Subject-specific
  4. None; all storage registers can alter their contents
- 3-52. In what transfer method is the receiving register cleared of its contents before a transfer occurs?
1. Single-line parallel
  2. Double-line parallel
  3. Complement
  4. Displaced
- 3-53. Of the following transfer methods used with registers, which one is the fastest?
1. Complement method
  2. Displaced method
  3. Direct method
  4. Forced method
- 3-54. What register can handle information in serial and parallel form?
1. Complement
  2. Storage
  3. Backup
  4. Shift
- 3-55. In linear circuits, the graph of output versus input approximates which of the following types of lines?
1. Wavy
  2. Arced
  3. Zigzag
  4. Straight
- 3-56. DMOS and bipolar technology is known by what acronym?
1. BIFET
  2. BIDFET
  3. BIDMOS
  4. MOSFET

3-57. The basic gate for a linear integrated circuit is a/an

1. operational amplifier
2. diffuser
3. catalyst
4. conductor

3-58. An inverting input of an op amp provides what degree of phase shift at the output?

1. 150
2. 180
3. 210
4. 315

3-59. All of the following types of circuits are part of a computer's linear integrated circuits except which one?

1. Digital circuits
2. Driver integrated circuits
3. Regulator integrated circuits
4. Analog signal conversion circuits

3-60. Which of the following circuits detect overtemperature conditions?

1. Timers
2. Analog converters
3. Digital converters
4. Comparators, voltage regulators, and switching regulators

3-61. Which of the following circuits can be used to produce an astable multivibrator?

1. Timers
2. Comparators
3. Switching regulators
4. Analog to digital converters

3-62. All of the following are classifications of systems interface circuits of a computer except which one?

1. Line drivers, receivers
2. Sense amplifiers, memory drivers
3. Peripheral and display drivers
4. Timers and analog-to-digital converters

3-63. Information is written into magnetic memories by which of the following drivers?

1. Line
2. Memory
3. Display
4. Peripheral

3-64. Display drivers use what type of input and output application?

1. Single
2. Dual
3. Trifold
4. Multiple

3-65. In the transmission of digital signals over short distances, which of the following types of line drivers and receivers are used?

1. Peripheral
2. Differential only
3. Single-ended only
4. Either differential or single-ended, depending on the design

3-66. For high-speed, long distance communications, which of the following types of drivers is/are used?

1. Single-ended only
2. Differential only
3. Both single-ended and differential
4. Basic wire cables

3-67. Timing circuits are used in a computer for which of the following reasons?

1. To keep track of calendar and clock times
2. To automatically make backup copies of data
3. To properly enable and disable circuits at specific times
4. To automatically disengage the computer if it becomes too hot

3-68. A program has been installed and the computer is operating. The enabling and disabling circuits will stop operating under each of the following conditions except which one?

1. Fault condition occurs
2. Programmed stop is reached
3. Program completion is reached
4. Instructions are executing

3-69. The master clock in a computer is the key to the computer's timing circuits. Master clocks usually operate at a frequency or pulse-repetition rate determined by which of the following factors?

1. The maximum speed of the operator
2. The minimum speed of the operator
3. The minimum rate the computer can handle data
4. The maximum rate the computer can handle data

3-70. In computer timing circuits, what is the most important reason for using oscillators?

1. Their output characteristics
2. Their frequency stability
3. Their phase processing
4. Their speed

IN ANSWERING QUESTIONS 3-71 THROUGH 3-74, SELECT FROM THE FOLLOWING LIST THE TYPE OF MULTIVIBRATOR DESCRIBED BY THE PHRASE IN EACH QUESTION.

1. Monostable
2. Bistable
3. Astable

3-71. The multivibrator that is also referred to as a one-shot multivibrator.

3-72. The multivibrator that counts clock pulses.

3-73. The multivibrator also known as a free-running multivibrator.

3-74. The multivibrator used to enable logic gates.

3-75. A single-phase clock system has what types of multivibrators?

1. Monostable and bistable
2. Bistable and astable
3. Monostable and astable
4. Astable and multistable